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## NOTES ON THE NESTING OF THE MOUNTAIN PLOVER

By W. C. BRADBURY

WITH EIGHT PHOTOS

**I**N JUNE, 1916, J. D. Figgins, Director of our local Museum, reported having seen several adult and young Mountain Plover (*Podasocys montanus*) about twenty miles east of Denver. Early in May of the following year, 1917, accompanied by a couple of young assistants I motored to the region, keenly watching for birds of this species, en route. Upon our arrival we scattered in different directions for an hour's search, but found nothing.

On our third trip to the same neighborhood, May 13, we discovered our first pair of birds from the auto. They were making short runs, and after watching them for a while, we lined up and systematically searched the ground over a large radius to discover the nest. We were obliged to leave without success, however, a stake being first driven into the ground to locate the point at which the birds were seen. The observations which follow will cover in general terms the nine trips to the same region, in which six sets, consisting of three eggs each were secured.

The ground is an open, rolling prairie, above the line of irrigation, and is devoted to cattle range. It is several miles from natural surface water and streams, and is covered with short-cropped buffalo or gramma grass, two or three inches high, with frequent bunches of dwarfed prickly pear, and an occasional cluster of stunted shrub or weed, rarely more than one foot in height.

With the six sets secured, in no instance had the parent bird taken advantage of the slight protection offered from sight or the elements by the nearby cactus, shrubs or uneven spots of ground. In each case, she had avoided such shelter, locating in the open, generally between the small grass hummocks and not on or in them; there was no evidence of the parent birds having given more thought to nest preparation or concealment, than does any other plover.

In two of the sets the eggs were all individually embedded in the baked earth to a depth of one-eighth to one-fourth of an inch, evidently having settled when the surface of the ground was reduced to soft mud by rain-water collecting in the slight depressions. As the ground dried the eggs were fixed in a perfect mould or matrix, from which they could not roll. In fact they could hardly be disturbed at all by the sitting birds. The only nesting material was a small quantity of fine, dry rootlets and dead "crowns" of gramma grass, the eggs in some instances being slightly embedded in this lining. As it is also present in all other depressions on the prairie it is highly probable that here as elsewhere it was deposited about the eggs by the wind and not through the agency of the birds themselves. (See figure 25.) The protective coloration of



Fig. 25. EGGS AND NEST OF MOUNTAIN PLOVER, AS PHOTOGRAPHED MAY 20, 1917, ABOUT TWENTY MILES EAST OF DENVER, COLORADO. EACH EGG HAD SETTLED IN THE SOFT MUD WHICH WHEN DRIED FORMED A PERFECT MOULD OR CAST FROM WHICH IT COULD NOT ROLL.

the nest and eggs, as well as of the rear view of the birds themselves, even when in motion, is unsurpassed. In no instance, except one hereinafter noted, was the bird seen to leave the nest, nor was any nest found except in the immediate vicinity of moving birds.

The site of the first pair of birds located and worked on May 13, 1917, was visited and carefully searched on three subsequent trips, always revealing one or both birds in practically the same spot, but never the nest.

On May 20, during a rain storm, we noticed two birds running at a distance of about thirty yards from the road. Stopping, four of us spent more than

half an hour in an unsuccessful effort to locate the nest, during which time the birds disappeared without evidencing interest in our movements. Upon our return a couple of hours later, they were again where first seen, and after a long search, during which the birds ran out of sight, a single egg was found. This



Fig. 26. MOUNTAIN PLOVER, WITH WINGS RAPIDLY OPENING AND CLOSING, AND BILL OPEN, AS SHE FOLLOWED THE CAMERA MAN BACK TO THE NEST.

apparently had been dropped at random, and so far as I could see, might as well have been deposited anywhere else on the prairie.

Placing a small stake with a tag about twenty steps distant, we left the egg. On revisiting the site one week later, May 27, my assistant found the birds present and finally located the nest, which then contained three fresh



Fig. 27. MOUNTAIN PLOVER, BETWEEN HER EGGS AND THE CAMERA, JUMPING FORWARD TO ATTACK THE FOOT OF THE PHOTOGRAPHER, WITH WINGS SNAPPILY OPENING AND CLOSING.

eggs. He reported that on this occasion one bird remained close by all the time he was in the vicinity of the nest, with wings outspread and making much fuss. She was the first to be observed making demonstrations of this character. These were the only perfectly fresh eggs taken.

On May 18, 1918, we visited the ground covered last year, and after tramping until hot and weary, entered the auto for a rest, slowly running the machine back and forth across the prairie. A bird was finally spotted, sitting bolt upright on its nest, but twenty or thirty yards distant. After watching for a while, Ludwig, my assistant, cautiously approached with the camera to within perhaps thirty feet, when the bird left the nest, which contained, as usual, three eggs. Then followed an unusual demonstration to attract the photographer from the vicinity. Spreading her wings horizontally to their extreme width while standing, then falling flat with her neck and wings extended their full length on the ground, at times with beak open (see figure 26), she retreated as he approached, or followed closely as he returned towards the nest. These antics were repeated until finally the camera was set up with one foot of the tripod within a foot or so of the nest, with a view of getting an exposure through the use of a string attachment.

During the focusing of the camera the bird exhibited great agitation, danc-



Fig. 28. MOUNTAIN PLOVER APPROACHING HER EGGS (IN LEFT FOREGROUND).

ing and jumping about Ludwig and the nest with wings rapidly opening and closing as if intending a direct attack. She finally settled on the eggs facing the camera. Desiring a picture showing the bird in action, Ludwig would gently swing his foot before her, sometimes touching her bill, when she would jump sidewise, forward or backward, and with bill open and wings snappily opening and closing, attack his foot. So rapid were her motions as she darted in and out of focus that it was difficult to get a perfect picture. (See figure 27.) Two of us were lounging on the ground about thirty feet away during this performance. But one bird was present on this occasion; when the eggs were blown they proved to be about one-half advanced in incubation.

On May 22, in the same vicinity and under similar conditions, we spotted a bird running about forty feet ahead of the machine. A short search soon located the nest and eggs, and Mr. Figgins, my companion on this trip, spent considerable time in an unsuccessful effort to photograph the bird. She evidenced no interest or solicitude whatsoever, but continued short runs just out

of range and finally took wing, an unusual occurrence under the circumstances. Nor did she return while we were photographing the nest and collecting the eggs, or during the considerable time we afterwards spent there. These eggs were the farthest advanced in incubation of any taken, being nearly ready to hatch.

In the case of the only perfectly fresh set of eggs taken, the parent, as stated, was very solicitous; in the half incubated set the bird exhibited extreme anxiety and aggressiveness; whereas, with the set about ready to hatch the parent cared for nothing but a quick escape. None of the others evidenced



Fig. 29. FOUR DIFFERENT POSES OF THE MOUNTAIN PLOVER AS SHE APPROACHED HER NEST, WATCHING THE PHOTOGRAPHER INTENTLY ALL THE WHILE.

more than casual, if any, interest in our proceedings. All of which rather "balis up" the theory I held, that the nearer the completion of incubation the more solicitous the parent. All eggs were comparatively fresh except one set taken on May 20, 1917, and the two sets taken, as stated, this year, and there was usually but one bird present. I have had no opportunity to study the parents with their young.

The fact that this many sets of Mountain Plover eggs were taken within the comparatively small area of probably one-half by one and one-half miles, together with my failure to note them on many other collecting trips on the



Fig. 30. MOUNTAIN PLOVER PARTIALLY COVERING HER EGGS WITHIN TWO FEET OF THE PHOTOGRAPHER.

prairies (numbers have been taken elsewhere in the state) would seem to indicate they are in a measure gregarious during the nesting season.

All sets collected contained three eggs and the dates are as follows, two being secured by other parties. In 1917: May 20, two sets; May 27, one set; May 28, one set; May 29, one set; June 7, one set. In 1918: May 18, one set; May 22, one set.



Fig. 31. EGGS OF MOUNTAIN PLOVER, IN PLACE. PHOTOGRAPHED MAY 20, 1917.

The accompanying photograph by Mr. Figgins (see figure 32) is of the four sets taken in 1917. There is some variation, of course, in the ground color of the eggs; but such difference is fully as noticeable in eggs of the same set as between those of different sets.

The following color description (Ridgway's Color Standards used) and measurements are by Mr. Lincoln, Curator of Ornithology, Colorado Museum of Natural History. Ground color, olive buff to dark olive buff or light yel-

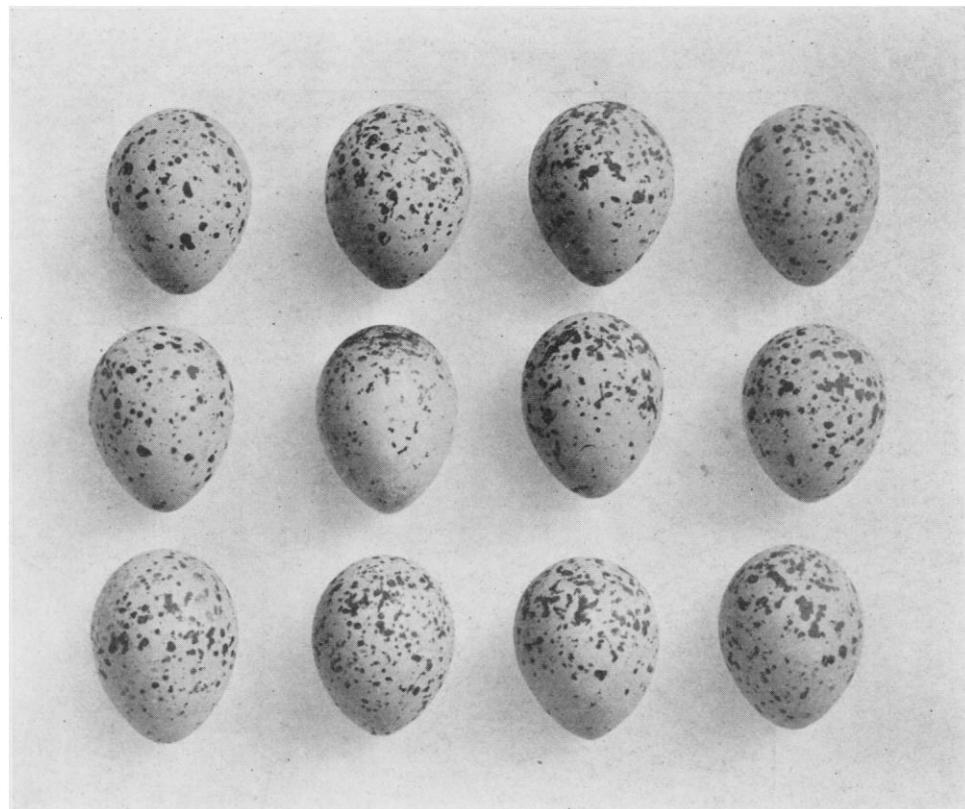


Fig. 32. FOUR SETS, OF THREE EGGS EACH, OF MOUNTAIN PLOVER. SETS ARE NUMBERED, BY VERTICAL ROW OF EGGS, AS REFERRED TO IN TEXT.

lowish olive, heavily spotted with blackish brown intermixed with smaller and paler spots, somewhat confluent on the larger end, varying in individual cases.

MEASUREMENTS IN INCHES OF EGGS OF MOUNTAIN PLOVER

Set no. 1	Set no. 2	Set no. 3	Set no. 4
1.45x1.11	1.48x1.10	1.43x1.10	1.55x1.13
1.47x1.10	1.45x1.12	1.51x1.11	1.50x1.13
1.47x1.11	1.49x1.13	1.49x1.14	1.49x1.13

Denver, Colorado, March 1, 1918.